



Design and technology Composites and components Mechanisms and Mechanical Systems

Unit:	Composite: (unit objective/objectives)	Components
Mechanisms - making a moving story book KSI Cycle A	To make a moving story book.	<ul style="list-style-type: none">• Know how to adapt mechanisms, using bridges or guides to control movement.• Know how to design a moving story book for a given audience.• Know how to follow a design to create moving models that use levers and sliders.• Know how to test a finished product seeing whether it moves as planned or not.• Know how to explain how and why a product can be fixed.• Know how to review the success of a product by testing it with the intended audience. • Know that a mechanism is the parts of an object that move together.• Know that a slider mechanism moves an object from side to side.• Know that a slider mechanism has a slider, slots, guides and an object.• Know that bridges and guides are bits of card that purposefully restrict the movement of the slider.



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Mechanisms - wheels and axles KSI Cycle A	Make a moving vehicle with working wheels and axles.	<ul style="list-style-type: none">• Know how to design a vehicle that includes wheels, axles and axle holders which allow the wheels to move.• Know how to create clearly labelled drawings that illustrate movement.• Know how to adapt mechanisms.• Know how to test mechanisms and identify what stops wheels turning.• Know that a wheel needs an axle in order to move. • Know that wheels need to be round to rotate and move.• Know that for a wheel to move it must be attached to a rotating axle.• Know that an axle moves within an axle holder which is fixed to the vehicle or toy.• Know that the frame of a vehicle (a chassis) needs to be balanced.• Know some real-life items that use wheels.



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Mechanisms - Making a moving monster. KSI Cycle B	Design and assemble a mechanical monster.	<ul style="list-style-type: none">• Know how to create a design criteria for a moving monster.• Know how to design a moving monster for a specific audience in accordance with design criteria.• Know how to make linkages using card for levers and split pins for pivots.• Know how to experiment with linkages adjusting the widths, lengths and thicknesses of card used.• Know how to cut and assemble components neatly.• Know how to evaluate own designs against design criteria.• Know how to use peer feedback to modify a design.• Know that mechanisms are a collection of moving parts that work together as a machine to produce movement.• Know that there is always an input and an output in a mechanism.• Know that an input is the energy that is used to start something working.• Know that an output is the movement that happens as a result of the input.• Know that a lever is something that turns on a pivot.• Know that a linkage mechanism is made up of a series of levers.



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Mechanisms - Fairground wheel KSI Cycle B	Design and build a structure with a rotating wheel.	<ul style="list-style-type: none">• Know that different materials have different properties and are therefore suitable for different uses.• Know that the features of a Ferris wheel include the wheel, frame, pods, a base, an axle, and an axle holder.• Know that it is important to test my design as I go along so that I can solve any problems that may occur.• Know how to select a suitable linkage system to produce the desired motions.• Know how to design a wheel.• Know how to select appropriate materials based on their properties.• Know how to select materials according to their characteristics.• Know how to follow a design brief.• Know how to evaluate different designs.• Know that different materials have different properties and are therefore suitable for different uses.• Know that the features of a Ferris wheel include the wheel, frame, pods, a base, an axle and an axle holder.• Know that it is important to test my design as I go along so that I can solve any problems that may occur.



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Mechanical systems - pneumatic toys LKS2 Cycle A	Design and create a pneumatic toy.	<ul style="list-style-type: none">• Know how to design a toy that uses a pneumatic system.• Know how to develop design criteria from a design brief.• Know how to generate ideas using thumbnail sketches and exploded diagrams.• Know that different types of drawings are used in design to explain ideas clearly.• Know how to create a pneumatic system to create a desired motion.• Know how to build secure housing for a pneumatic system.• Know how to use syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy.• Know how to select materials due to their functional and aesthetic characteristics.• Know how to manipulate materials to create different effects by cutting, creasing, folding and weaving.• Know how to use the views of others to improve designs.• Know how to test and modify the outcome, suggesting improvements.• Know how to understand the purpose of exploded-diagrams through the eyes of a designer and their client.• Know how pneumatic systems work.• Know how pneumatic systems can be used as part of a mechanism.• Know that pneumatic systems operate by drawing in, releasing and compressing air.



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Mechanisms - Making a slingshot car LKS2 Cycle B	<ul style="list-style-type: none">• Design and construct a slingshot car and conduct trials to draw conclusions and suggest improvements from the results.	<ul style="list-style-type: none">• Know how to draw a net to create a structure form.• Know how to choose shapes that increase or decrease speed as a result of our resistance.• Know how to personalise a design.• Know how to measure, mark, cut and assemble with increasing accuracy.• Know how to make a model based on a chosen design.• Know how to evaluate the speed of a final product based on the effect of shape on speed and the accuracy of workmanship on performance.• Know that all moving things have kinetic energy.• Know that kinetic energy is the energy that something (an object/person) has by being in motion.• Know that air resistance is the level of drag on an object as it is forced through the air.• Know that the shape of a moving object will affect how it moves due to air resistance.



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Mechanical systems: Making a pop-up book UKS2	<ul style="list-style-type: none">• Design and produce a pop-up book.	<ul style="list-style-type: none">• Know how to design a pop-up book which uses a mixture of structures and mechanisms.• Know the name of each mechanism and be able to name input and output accurately.• Know how to storyboard ideas for a book.• Know how to follow a design brief to make a pop-up book, neatly and with a focus on accuracy.• Know how to make mechanisms and/or structures using sliders, pivots and folds to produce movement.• Know how to use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.• Know how to evaluate the work of others and receive feedback on own work.• Know how to suggest points for improvement.• Know that mechanisms control movement.• Know that mechanisms can be used to change one kind of motion into another.• Know how to use sliders pivots and folds to create paper-based mechanisms.• Knows that a design brief is a description of what is going to be designed and made.• Know that designers often want to hide mechanisms to make a product more aesthetically pleasing.



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Mechanical systems - Automata toys UKS2 Cycle B	<ul style="list-style-type: none"> • Develop a design idea with some descriptive notes. • Explore different cam profiles and choose three for their follower toppers with an explanation of their choices. • Create neat, decorated follower toppers with some accuracy. • Measure and cut panels that fit with some inaccuracies to conceal the inner workings of the automata. • Decorate and finish the automata to meet the design criteria and brief. • Evaluate their finished product, making descriptive and reflective points on function and form. 	<ul style="list-style-type: none"> • Know how to experiment with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement. • Know how linkages change the direction of a force. • Know how to make things move at the same time. • Know how to draw cross-sectional diagrams to show the inner-workings of my design. • Know how to measure, mark and check the accuracy of the jelutong and dowel pieces required. • Know how to measure, mark and cut components accurately using a ruler and scissors. • Know how to assemble components accurately to make a stable frame. • Know that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles. • Know how to select appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set. • Know how to evaluate the work of others and receive feedback on own work. • Know how to apply points of improvement to their toys. • Know how to describe changes they would make/do if they were to do the project again. • Know that the mechanism in an automata uses a system of cams, axles and followers. • Know that different shaped cams produce different outputs. • Know that an automata is a hand-powered mechanical toy. • Know that a cross-sectional diagram shows the inner workings of a product.